

## CLAIM AMENDMENTS

1 - 3. (canceled)

1           4. (currently amended) The system unit according to  
2 claim 15 wherein the expansion vessels further include a middle  
3 expansion vessel, the upstream expansion vessel for the gas mixture  
4 obtained by desorption comprising hydrogen and carbon monoxide [[,  
5 has]] having a line going to the heat exchanger and a line going to  
6 the middle expansion vessel for the methanol containing liquid.

1           5. (currently amended) The system unit according to  
2 ~~claim 15, further comprising a~~ 4 wherein the middle expansion  
3 vessel for the carbon dioxide gas obtained by desorption has a line  
4 going to the heat exchanger and a line going to the downstream  
5 expansion vessel for the methanol containing liquid.

1           6. (currently amended) The system unit according to  
2 claim 15 wherein the downstream expansion vessel for the gaseous  
3 carbon dioxide obtained by desorption has a line going to the heat  
4 exchanger and a line for the methanol containing liquid to the  
5 absorber connected by a line feeding the methanol heated up there  
6 to the liquid/gas separator.

1           7. (previously presented) The system unit according to  
2 claim 15 wherein the liquid/gas separator has a branch line feeding  
3 gaseous carbon dioxide and another line feeding separated methanol  
4 to the downstream regenerator.

1           8. (previously presented) A process for desorption of  
2 carbon dioxide and other gaseous impurities from methanol in the  
3 system in accordance with claim 15, wherein the desorption is  
4 carried out stepwise in the expansion vessels, the heat exchanger  
5 and the liquid/gas separator, the process comprising the steps of:

6           feeding the methanol leaving the expansion vessel C at a  
7 temperature of  $-60^{\circ}\text{C} \pm 10^{\circ}\text{C}$  and a pressure of 1 to 2 bar into the  
8 heat exchanger E,

9           heating the methanol in the heat exchanger to a  
10 temperature of  $-10 \pm 5^{\circ}\text{C}$  and thereafter feeding the heated  
11 methanol into the liquid/gas separator D, and

12           flowing substances between the expansion vessels and to  
13 the heat exchanger and liquid/gas separator primarily by a  
14 thermosiphon effect.

9. (canceled)

1           10. (previously presented) The process according to  
2 claim 8 wherein in the upstream expansion vessel the pressure  
3 decreases from about 55 bar to about 9 bar and mainly hydrogen and

4 carbon monoxide are desorbed at a temperature of about  $-45^{\circ}\text{C}$ , the  
5 method further comprising the steps of  
6 recovering a gas fraction obtained after passing through  
7 the heat exchanger to the process, and  
8 feeding the liquid fraction to a middle expansion vessel  
9 between the upstream and downstream vessels.

1 11. (previously presented) The process according to  
2 claim 8 wherein in a middle expansion vessel between the upstream  
3 and downstream vessels the pressure decreases from about 9 bar to  
4 about 2.7 bar and a liquid fraction is obtained along with gaseous  
5 carbon dioxide at a temperature of about  $-45^{\circ}\text{C}$ , to about  $-52^{\circ}\text{C}$ , the  
6 process further comprising the step of  
7 feeding the gaseous carbon dioxide through the heat  
8 exchanger E and thence out of the system feeding the liquid  
9 fraction to the downstream expansion vessel.

1 12. (previously presented) The process according to  
2 claim 8 wherein, in the downstream expansion vessel pressure  
3 decreases from about 2.7 bar to about 1.2 bar and gaseous carbon  
4 dioxide is obtained at a temperature of about  $-52^{\circ}\text{C}$ , to about  
5  $-60^{\circ}\text{C}$ , the process further comprising the step of  
6 feeding the gaseous carbon dioxide through the heat  
7 exchanger and thence out of the system.

1           13. (previously presented) The process according to  
2 claim 8, further comprising the steps of  
3           dividing a liquid fraction in the downstream expansion  
4 vessel C into two streams,  
5           feeding one of the streams to the absorber and  
6           passing the other stream through the heat exchanger via  
7 the output line and feeding it to the liquid/gas absorber.

1           14. (previously presented) The process according to  
2 claim 8, further comprising the steps of:  
3           recovering a liquid fraction in the liquid/gas separator,  
4           feeding the recovered liquid fraction to the regenerator  
5 for removal of the last traces of carbon dioxide, and  
6           purifying a gas fraction with further carbon dioxide rich  
7 gas fractions is obtained to the process.

1           15. (currently amended) A system comprising:  
2           an absorber in which high-pressure methanol is contacted  
3 with synthesis gas to transfer impurities including carbon dioxide  
4 from the gas to the methanol;  
5           a heat exchanger having a top side and a bottom side;  
6           a plurality of series-connected expansion vessels  
7 including an upstream expansion vessel and a downstream expansion  
8 vessel;

9 means for feeding impurity-laden methanol from the  
10 absorber through the heat exchanger. through the upstream expansion  
11 vessel, and into the downstream expansion vessel for forming in the  
12 downstream expansion vessel a body of methanol having a liquid  
13 level;

14 a liquid/gas separator;

15 an inlet line feeding methanol from the downstream  
16 expansion vessel through the bottom side into the heat exchanger,  
17 the inlet line having a portion about 0.5 m below the bottom side ~~7~~  
18 ~~whereby carbon dioxide is desorbed from the methanol in the~~  
19 ~~separator;~~

20 an output line extending from the top side of the heat  
21 exchanger to the liquid/gas separator to form therein a body of  
22 methanol having a liquid level, whereby carbon dioxide is desorbed  
23 from the methanol in the separator, the liquid/gas separator and  
24 downstream expansion vessel being relatively oriented such that the  
25 liquid level in the downstream expansion vessel is between 1 m and  
26 20 m above the liquid level in the liquid/gas separator, the  
27 liquid/gas separator and the heat exchanger being relatively  
28 oriented such that the liquid level in the liquid/gas separator is  
29 about 0.5 m above the top side of the heat exchanger; and

30 a regenerator receiving methanol from the liquid-gas  
31 separator.